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Patents Form # 4

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PROVISIONAL SPECIFICATION

Title A Protector

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do hereby declare this invention to be described in the following statement :

- 1 -

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ABSTRACT OF THE DISCLOSURE

5 The invention comprises a protector or bag of latex rubber or a similar stretchable, substantially impervious material. One version of the bag has one opening - located at one end, and the opening is of dimensions such that when in place over a limb of a person or an animal it forms a substantially watertight seal about the opening so that water cannot gain entry. The protector or bag has a size and shape suitable for being placed loosely over a limb of a person or an animal - though maintaining a watertight seal about its opening. Another version of the bag has a second opening, at the other end, and then can form a kind of collar over a limb while leaving the extremity uncovered. A third version is a composite of a plastics material and a rubber sealing ring. The purpose of the bag is to shield the limb and any dressings or plaster casts or the like from water during a bathing procedure or the like.

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FIELD OF THE INVENTION

20 This invention relates to the field of protection of bandages or dressings from water, in particular.

BACKGROUND

25 When a person (or an animal) has a dressing applied, it is usual for that dressing to be susceptible to the effects of water. For example an absorbent bandage will take up water and become soggy and an ideal breeding area for bacteria, and may attract flies. A plaster cast, unless it is one of the expensive resin casts, is highly susceptible to water - it will break down if it is wetted.

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Several known methods for protecting a plaster cast on an arm or a leg, for example, include such things as locating a plastic bag and wrapping it around the dressing to be protected. Almost invariably this is unsuccessful. Some specially designed commercial products exist, having complex sealing means at one end of a closed bag. Yet these have not proven to be acceptable.

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There remains a need for a cheap, effective, re-usable protector from dressing or the like.

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OBJECT

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It is an object of the present invention to provide an improved device for the inclusion or exclusion of a fluid or other agents from a dressing, particularly a dressing applied to a limb, or one which will at least provide the public with a useful choice.

These and other objects of the invention will be apparent to the ordinary artisan upon consideration of the specification as a whole.

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STATEMENT OF THE INVENTION

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In one aspect the invention provides a protector or bag made of a resilient material, the bag having dimensions such that it is capable of lying loosely over a dressed body part, and the bag having at least one opening, the opening having dimensions such that it is capable of gripping a limb tightly above a dressed portion.

Generally the body part will be a limb.

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Preferably the circumference of the (or each) aperture when not stretched is substantially less than the circumference of the body part over which it is to be applied.

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Preferably the resilient material is a rubber latex material. Preferably the thickness of the material is sufficient to confer some durability, yet lack enough weight to affect the limb.

A preferred thickness is about 0.05 mm.

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Alternatively the protector or bag may be made of a plastics material having similar recovery after a stretching distortion to a rubber latex material.

Alternatively the protector or bag may be made as a composite, the bag itself being a plastics material and being provided with a rubber-like sealing ring surrounding the or each aperture.

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Preferably the bag is made with dimensions to suit:
an adult human arm, an adult human leg, a large child's arm, a large child's leg, a small child's arm and a small child's leg.

10 Preferably each size is available in half-length (eg half arm) or full length versions.

Alternatively the bag may be made with dimensions to suit the forelimb or the hind limb of an animal to be treated for injury or the like.

15 Optionally the protector or bag may be made with an aperture at each end, for use as a collar to protect a dressing while leaving the proximal and the distal portions of the limb exposed.

20 Optionally the invention may be provided together with a dilating means that serves to carry the aperture, in a stretched configuration, over the limb for the purpose of application, or for the purpose of removal.

A preferred dilating means resembles an "Elastrator (TM)" applicator.

25 In a related aspect the invention provides a method of manufacture for bags according to the above description, in which:

(1) a shaped form, attached to a support by a relatively thin support means, is dipped into an emulsion of latex and

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(2) removed for drying, and

(3) after stripping, an aperture of defined size is cut from the rubber skin at the region surrounding the support means.

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DRAWINGS

5 The following is a description of a preferred form of the invention, given by way of example only, with reference to the accompanying diagrams.

10

Fig 1: is an illustration of an arm protector according to the invention.

Fig 2: is an illustration of a leg protector of the present invention.

15 Fig 3: is an illustration of a composite protector, having a rubbery or stretchy aperture and a non-stretchy bag portion.

Fig 4: is an illustration of a limb protector of the present invention, with two apertures.

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PREFERRED EMBODIMENT

25 The invention comprises a protector or bag of latex rubber or a similar stretchable, substantially impervious material. The bag has one opening - located at one end, and the opening is of dimensions such that when in place over a limb of a person or an animal it forms a substantially watertight seal about the opening so that water cannot gain entry. The protector or bag has a size and shape suitable for being placed loosely over a limb of a person or an animal - though maintaining a watertight seal about its opening. The purpose of the bag is to shield the limb and any dressings or plaster casts or the like from water during a bathing procedure or the like.

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35 The single opening into the protector or bag has a relatively small aperture. An example arm bag has an aperture 50 mm in circumference, intended for use on an arm at a place that is perhaps 250-280 mm in circumference. It can be seen that the rubber, which is not (at least in prototypes) thickened in any way at the opening, will be subjected to a

considerable amount of stretching when it is in place. This stretching results in a relatively watertight seal.

5 Fig 1 shows an arm protector 100, suitable for protection of a cast covering the lower arm. The aperture 101 leads into the bag. The area 102 is shaped so as to accommodate the fingers and thumb. The weight of this protector or bag is about 100 g.

Fig 2 shows a leg protector 200, suitable for a tibial or an ankle fracture-stabilising cast.
10 The aperture is at 201, and a toe pocket is shown at 202. This weighs about 250g. A series of printed lines 203 may be printed onto a protector in order to guide scissors, if an opening needs to be enlarged.

Users of the invention are recommended to put the protector or bag on to the affected
15 limb immediately prior to exposure to water, and the take it off again soon afterwards. A wearing time of 15 minutes maximum is recommended. This minimises sweating causing dampness, minimises interference with blood flow, and minimises the risk of puncture or tear damage to the bag. The bag itself may be washed before re-use, and it is preferably dusted with talcum powder between uses.

20 The presently preferred material is latex rubber - that is, generally a rubber which has been deposited on a surface from an emulsion. Although we have attempted to find a suitable plastics material we have as yet not located a plastics material that can be stretched to perhaps 2 or 4 times their original length, and then return to its original
25 dimensions. A suitable material would be preferable, if for example it lacks the characteristic smell of rubber.

A method of manufacture for bags as described above may include: (1) a shaped form (one of a number of optional sizes or shapes), is attached to a support by a relatively
30 thin support means. It is dipped into an emulsion of latex and (2) removed for drying, and (3) after stripping from the form, an aperture of defined size is cut from the rubber skin region surrounding the support means.

For those cases where it is difficult, or painful, to put on or take off the bag, because of
35 pressure on sensitive parts of the limb, we propose to develop an expander device. This somewhat resembles the "Elastrator" (TM) applicator used in agriculture. It comprises a

plier-like device wherein four parallel and adjacent rods, bent to lie parallel to the hinge of the pliers, can be passed through a rubber ring. When the handles are squeezed together the parallel rods move apart from one another and dilate the ring. Preferably the ends of the rods in our version are rounded so that they cannot either damage the person or the bag that is being donned.

Optionally the protector or bag may be made with an aperture at each end, for use as a collar to protect a dressing while leaving the proximal and the distal portions of the limb exposed. This may be particularly useful where a patient has to care for himself or herself and needs to have

the hand (or foot) free when bathing. Fig 4 illustrates a bag 400 with an opening 401 and a second opening 402 (which may be smaller).

For individuals having particularly well-developed limbs, or where for some other reason the hole as provided is too small, we can stamp or print a series of concentric lines about the aperture so that the patient or a nurse can cut along a line with scissors to enlarge the aperture.

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VARIATIONS

1. Various shape modifications may be made for specialised applications.

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The invention may be used to retain a fluid or a jelly in contact with a body part. This may be useful in the case of a burn or the like, when a saline solution, or a jelly, is one form of treatment or at least initial support prior to treatment. The bag as sold is not normally made sterile, but it can be sterilised by for example gamma-ray irradiation. Here it would be helpful to minimise the tightness of the seal, because otherwise exudate from damaged tissue will be raised, on account of the raised venous pressure. This type of protection may be useful in military and other first-aid situations.

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The bag may be used for animal treatments, such as when a domestic pet with a broken leg is to be bathed.

2. Another variation is a protector or bag made of a conventional, flexible but non-stretchy plastics material, with a rubber seal at one or at each end. Fig 3 shows this version, 300. It comprises a plastic bag 301 which may be welded to form any desired shape. A preferred plastics material is polyethylene, .05 cm thick. A preferred seal is a ring or washer shape 302 made of "Neoprene", nitrile rubber, or similar, or a natural rubber, such as a latex. This provides an equivalent tight seal to the seal described previously. The plastic bag and the rubbery seal may be glued or otherwise stuck together about the periphery 303 of the washer, optionally after pre-treatment of the plastic to improve adherence. An advantage of this protector or bag is that the bag may be stored flat, prior to use. Another advantage is that there is a minimal amount of potentially smelly rubber.
- 15 Use of the invention allows a person afflicted with a plaster cast or the like to bathe, shower, or swim without risking wetting the dressing. The device is washable and re-usable; with maintenance limited in general to application of talcum powder as is usual with reusable rubber gloves.
- 20 Finally, it will be appreciated that various alterations and modifications may be made to the foregoing without departing from the scope of this invention as set forth.

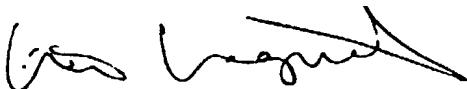
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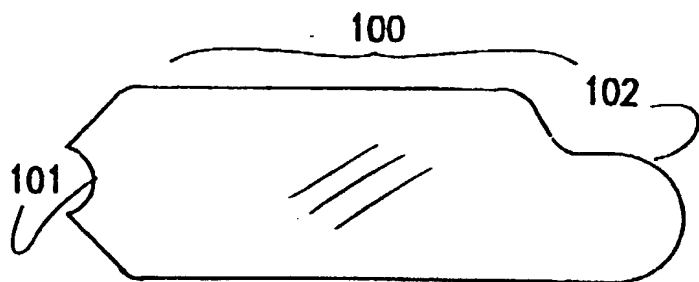


Fig 1

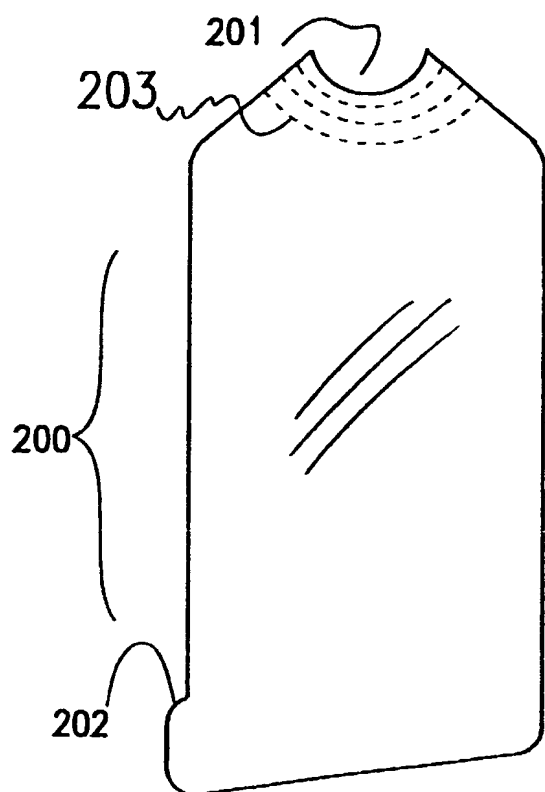


Fig 2

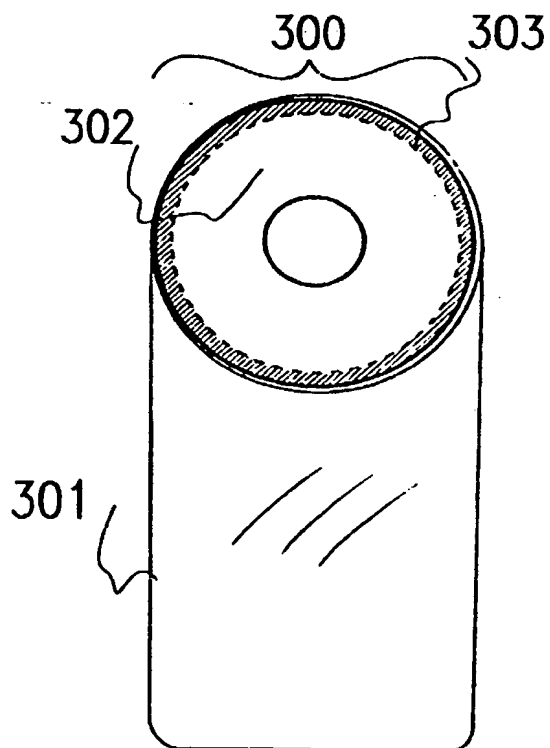


Fig 3

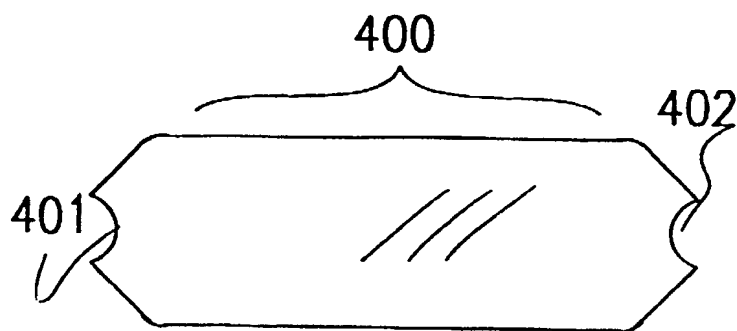


Fig 4

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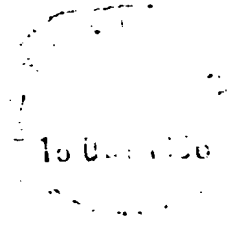
Patents Form # 5

NEW ZEALAND

Patents Act 1953

COMPLETE SPECIFICATION

TITLE : A Protector
APPLICATION # : 280249
FILING DATE : 16 October 1995



I, : **David William Hogg**
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Nationality: **New Zealand**

hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :

FIELD OF THE INVENTION

5 This invention relates to the field of bandages or dressings and more particularly to means to shield limbs or parts thereof from washing water from time to time.

BACKGROUND

10 When a person (or an animal) has a dressing applied, it is usual for that dressing to be susceptible to the effects of water. For example an absorbent bandage will take up water and become soggy and an ideal breeding area for bacteria, and may attract flies. A plaster cast, unless it is one of the expensive resin casts, is particularly susceptible to water - it will break down if it is wetted. Usually, it is desirable for an injured area of skin to be
15 shielded from water, particularly water splashed about during bathing.

Several known methods for protecting a plaster cast on an arm or a leg, for example, include such things as locating a plastic bag and wrapping it around the dressing to be protected. Almost invariably this is unsuccessful owing to imperfect sealing between the
20 orifice of the bag about the limb. Some specially designed commercial products exist, having complex sealing means at one end of a closed bag. Yet these have not proven to be acceptable.

On occasion it may be desirable to create a special environment around an injured area,
25 such as a highly oxygenated area about a skin graft, or an insecticide-laden zone about an area affected by fly strike.

DEFINITIONS

30 "Physiologically acceptable" means that the tightness of the seal is less than a loading which would substantially prevent the flow of body fluids within the limb, beneath the seal - or at least would have no deleterious effect on venous blood and even lymph drainage over period of one hour.

35 "Moderate dilation" means that when the aperture is stretched so that a portion of a limb can be passed through the aperture, the amount of stretching is less than will cause failure of the material surrounding the aperture and is less than will cause a prevention

of the flow of body fluids inside the limb and under the region of the seal.

OBJECT

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It is an object of the present invention to provide an improved device for the inclusion or exclusion of a fluid or other agents from a region of the body, or one which will at least provide the public with a useful choice.

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STATEMENT OF THE INVENTION

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In a first broad aspect the invention comprises a method for sealing, from time to time, at least a part of a limb of a body of a mammal in order to separate the part of the limb from an external environment, comprising placing a generally loose protector over the limb and forming a physiologically acceptable seal thereon wherein said protector comprises a waterproof receptacle having at least one aperture therein, the receptacle being formed by a membrane, with an integral border thereof defining the said at least one aperture, said border being resilient, non-reinforced and configured to be adapted on moderate dilation of admitting a portion of the limb into the receptacle and to form, upon release, a physiologically acceptable seal thereon.

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In a second broad aspect the invention comprises a protector for use in sealing off, from time to time, at least a part of a limb of a body of a mammal from an external environment, the protector comprising a waterproof receptacle having at least one aperture therein, the receptacle being formed by a membrane with an integral border thereof defining the said at least one aperture, said border being resilient, non-reinforced and adapted on moderate dilation of admitting a portion of the limb into the receptacle and to form a physiologically acceptable seal thereon.

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In a related aspect the invention comprises a protector as previously described wherein said integral border defining said at least one in use, is between 3 and 30 mm in width, does not exhibit longitudinal wrinkles capable of channelling contaminants through the seal, and is capable of pressing on the skin with a pressure great enough to effectively halt the passage of contaminants between the skin and the membrane adjacent to the skin, but substantially not great enough to stop the flow of

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fluids inside the limb.

5 In a further related aspect the invention comprises a protector as previously described wherein the entire protector is made of a resilient material.

In a yet further related aspect the invention comprises a protector as previously described wherein the resilient material is rubber latex.

10 In a still further related aspect the invention comprises a protector as previously described, wherein the thickness of the material is between 0.2 and 1 mm, so that the material has useful durability, yet is not heavy enough to drag on the limb.

15 More preferably the thickness of the material is about 0.5 mm.

In a third broad aspect the invention comprises protector as previously described, wherein those portions of the protector remote from the aperture or apertures are made from a substantially non-resilient material.

20 In a fourth broad aspect the invention comprises a range of protectors, any one of which is as previously described, wherein the range includes more than one size of protector in order to be compatible with various sizes of human limbs.

25 In a related aspect the invention comprises a range of protectors, any one of which is as previously described, wherein the range includes more than one size in order to be compatible with various sizes of animal limbs.

30 In a further broad aspect the invention comprises protector as previously described, wherein a series of concentric indicia are placed on the resilient integral border about the or each aperture; the indicia being capable of acting as cutting guides for enlargement of the or each aperture.

35 In yet another aspect the invention comprises a method for making a protector as previously described, comprising the steps of dipping a shaped form into an emulsion of latex, then removing it for drying and then stripping the dried latex off the mould, and then cutting at least one aperture of a size capable of forming a sealable opening

with a mammalian limb.

5 In a further aspect the invention provides a method for applying a protector as previously described comprising the steps of opening the aperture with the jaws of a dilator, and passing the opened aperture about the jaws over the dressed limb until the opened aperture is at a site where the seal is to be applied, and then removing the dilator whereupon the seal is formed against the site.

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DRAWINGS

The following is a description of a preferred form of the invention, given by way of example only, with reference to the accompanying diagrams.

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Fig 1: is an illustration of an arm protector according to the invention.

Fig 2: is an illustration of a leg protector of the present invention.

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Fig 3: is an illustration of a composite protector, having a rubbery or resilient aperture and a non-resilient bag portion.

Fig 4: is an illustration of a limb protector of the present invention, with two apertures.

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PREFERRED EMBODIMENT

30 This invention provides a type of dressing useful for temporarily enclosing a limb of a body of a mammal so that the mammal (usually a human) can have a shower, a bath, or go swimming without getting some water-susceptible dressing wet. A person with a broken arm inside a plaster cast has to take precautions to avoid getting it wet, and the invention offers one means for preventing that. There are other occasions where an arm or a leg has to be protected from the external environment - such as during recovery from burns or with skin grafts, or other locally applied treatments. The dressing of this invention provides an effective seal about a limb by means of one or more apertures
35 having a resilient border surrounding them. Each aperture forms a tight band against the skin, which is tight enough and broad enough to block the entry of water (or the like)

yet is preferably not so tight that the circulation is cut off. We term this a "physiologically acceptable" seal. (Some impediment to circulation such as of the lymphatic drainage can occur but the invention is intended generally for use only during limited periods). The invention exploits the particular properties of rubber latex.

The invention when in place resembles a loose, floppy waterproof bag or receptacle having one or more (but usually no more than two) holes or apertures through which the limb enters the bag at a proximal end, and may also leave the bag at the distal end. The receptacle is formed by a membrane with integral borders defining said apertures. The bag is tight around the aperture or apertures and thereby encloses an effectively sealed environment. Generally the bag is made of rubber latex of a substantially uniform thickness of between 0.2 and 1 mm. so that the material has useful durability, yet is not heavy enough to drag on the limb. A preferred thickness is about 0.5 mm.

Each aperture is defined by a border as above described. The border is resilient and generally this is the latex wall of the bag and the or each aperture is capable on moderate dilation of admitting a portion of the limb and thereupon forming a physiologically acceptable, effective seal between an exterior surface of the limb and the resilient border of the aperture. The border of the aperture remains stretched as it lies about the limb, and so exerts a continuous pressure against the skin, over a width of typically 10 to 30 mm. This comprises the area of the seal. Because the border is stretched, it does not include wrinkles passing from the inside of the bag to the outside, and so provides a good seal against the ingress of water. because the pressure is applied over an area, it does not so easily cut off the circulation inside the limb, though the user or a nurse or some other attendant should monitor the tightness and if a particular aperture seems to exert too much pressure, it can be enlarged by removing a strip from the inner border with a pair of scissors.

We can have marks printed on the latex to act as cutting guides but the process may not be cost-effective.

The protector of the invention is intended to be used more than once although if there is infection about, it may not be advisable to use it on more than one person. Provided that the rubber latex is dried after use and powdered with talcum powder, it can be re-used for several months although accidental perforation can be a problem.

5 Users of the invention are recommended to put the protector or bag on to the affected limb immediately prior to exposure to water, and take it off again soon afterwards. A wearing time of 15 minutes maximum is recommended. This minimises sweating causing dampness, minimises interference with blood flow, and minimises the risk of puncture or tear damage to the bag. The bag itself may be washed before re-use, and it is preferably dusted with talcum powder between uses.

10 Considering the shape of the bag, it has a size and shape suitable for being placed loosely over a limb of a person or an animal - while maintaining a watertight seal about its opening. The purpose of the bag is to shield the limb and any dressings or plaster casts or the like from water during a bathing procedure or the like. The bag usually has one opening - located at one end, and the opening is of dimensions such that when in
15 place over a limb of a person or an animal it forms a substantially watertight seal about the opening so that water cannot gain entry. The protector or bag

For the preferred rubber latex, we generally use a thickness of 0.5 mm because this gives a reasonable balance between durability and light weight.

20 The opening into the protector or bag has a relatively small aperture, when unstretched. Latex has the useful property for this application of being highly extensible. An example arm bag has an aperture 50 mm in circumference, intended for use on an arm at a place that is perhaps 250-280 mm in circumference. It can be seen that the rubber, which is not
25 (at least in prototypes) thickened in any way at the opening, will be subjected to a considerable amount of stretching when it is in place. This stretching results in a relatively watertight seal.

Fig 1 shows an arm protector 100, suitable for protection of a cast covering the lower
30 arm. The aperture 101 leads into the bag. The area 102 is shaped so as to accommodate the fingers and thumb. The weight of this protector or bag is about 100 g.

Fig 2 shows a leg protector 200, suitable for a tibial or an ankle fracture-stabilising cast. The aperture is at 201, and a toe pocket is shown at 202. This weighs about 250g. A
35 series of printed lines 203 may be printed onto a protector in order to guide scissors, if an opening needs to be enlarged.

5 We also produce an arm bag with an aperture at both ends. This would allow a forearm to be covered and kept dry while the hand is outside the protected area and can be active in some way in a washing operation.

10 We can also produce the protector in a form suitable for use with animals' limbs. The problems are largely a matter of producing a sufficient range of shapes and sizes to cover the range of possible requirements. Here, the presence of hair may adversely affect the seal and perhaps a line about the seal will help to minimise the ingress of water by capillary attraction.

15 While the invention particularly addresses the protection of any limb, it may be possible to produce bags adapted to protect the trunk or the head in some way. Limbs tend to be frequently in need of this type of protection, as with skiers.

20 The presently preferred material is latex rubber - that is, generally a rubber which has been deposited on a surface from an emulsion. Although we have attempted to find a suitable plastics material we have as yet not located a plastics material that can be stretched to perhaps 2 or 4 times their original length, and then return to its original dimensions. A suitable material would be preferable, if for example it lacks the characteristic smell of rubber. We regard the protector as re-usable, at least upon the same person's limb over a single course of treatment, although it could be disposed of after a single use, and it could, under certain circumstances and if adequately sterilised or disinfected, be used on other patients.

30 A method of manufacture for bags as described above may include the following steps: (1) a shaped form (one of a number of optional sizes or shapes), is attached to a support by a relatively thin support means. It is dipped into an emulsion of latex and (2) removed for drying, and (3) after stripping from the form, an aperture of defined size is cut from the rubber skin region surrounding the support means.

35 For those cases where it is difficult, or painful, to put on or take off the bag, because of pressure on sensitive parts of the limb, we propose to develop an expander device. This somewhat resembles the "Elastrator" (TM) applicator used in agriculture. It comprises a plier-like device wherein four parallel and adjacent rods, bent to lie parallel to the hinge of the pliers, can be passed through a rubber ring. When the handles are squeezed

5 together the parallel rods move apart from one another and dilate the ring. Preferably the ends of the rods in our version are rounded so that they cannot either damage the person or the bag that is being donned.

10 Optionally the protector or bag may be made with an aperture at each end, for use as a collar to protect a dressing while leaving the proximal and the distal portions of the limb exposed. This may be particularly useful where a patient has to care for himself or herself and needs to have the hand (or foot) free when bathing. Fig 4 illustrates a bag 400 with an opening 401 and a second opening 402 (which may be smaller).

15 For individuals having particularly well-developed limbs, or where for some other reason the hole as provided is too small, we can stamp or print a series of concentric lines about the or each aperture so that the patient or a nurse can cut along a line with scissors to enlarge the aperture. Although the invention can be sold in a range of sizes, it is possible to modify any given unit by widening the aperture, taking a ring of material from the edge of the aperture, so that it will then fit more comfortably on a larger limb.

20 VARIATIONS

- 25 1. Various shape modifications may be made for specialised applications.
2. The invention may be used to retain a fluid or a jelly in contact with a body part. This may be useful in the case of a burn or the like, when a saline solution, or a jelly, is one form of treatment or at least initial support prior to treatment. The bag as sold is not normally made sterile, but it can be sterilised by for example
30 gamma-ray irradiation. Here it would be helpful to minimise the tightness of the seal, because otherwise exudate from damaged tissue will be raised, on account of the raised venous pressure. This type of protection may be useful in military and other first-aid situations.
- 35 3. The bag may be used for animal treatments, such as when a domestic pet with a broken leg is to be bathed.
4. Another variation is a protector or bag made of a conventional, flexible but

non-resilient plastics material, with a rubber seal at one or at each end. Fig 3 shows this version, 300. It comprises a plastic bag 301 which may be welded to form any desired shape. A preferred plastics material is polyethylene, 0.05 cm thick. A preferred seal is a ring or washer shape 302 made of "Neoprene", nitrile rubber, or similar, or a natural rubber, such as a latex. This provides an equivalent tight seal to the seal described previously. The plastic bag and the rubbery seal may be glued or otherwise stuck together about the periphery 303 of the washer, optionally after pre-treatment of the plastic to improve adherence. An advantage of this protector or bag is that the bag may be stored flat, prior to use. Another advantage is that there is a minimal amount of potentially smelly rubber.

ADVANTAGES

Use of the invention allows a person wearing a water-susceptible plaster cast or the like, or having an open wound which should not be brought into contact with water to bathe, shower, or swim without risking wetting the dressing. The device is washable and re-usable; with maintenance limited in general to application of talcum powder as is usual with reusable rubber gloves.

In comparison to some prior-art versions, the seal produced by the latex around the openings is quite satisfactory in terms of preventing the ingress of water or the like. Prior-art solutions to the problem generally comprise using a large plastic bag such as a rubbish bag which is closed up against the limb, but usually it is extremely difficult to form a watertight seal in this way.

Finally, it will be appreciated that various alterations and modifications may be made to the foregoing without departing from the scope of this invention as set forth in the following claims.

WHAT I CLAIM IS:

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1. A method for sealing, from time to time, at least a part of a limb of a body of a mammal in order to separate the part of the limb from an external environment, comprising placing a generally loose protector over the limb and forming a physiologically acceptable seal thereon wherein said protector comprises a waterproof receptacle having at least one aperture therein, the receptacle being formed by a membrane, with an integral border thereof defining the said at least one aperture, said border being resilient, non-reinforced and configured to be adapted on moderate dilation of admitting a portion of the limb into the receptacle and to form, upon release, a physiologically acceptable seal thereon.

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2. A protector for use in sealing off, from time to time, at least a part of a limb of a body of a mammal from an external environment, the protector comprising a waterproof receptacle having at least one aperture therein, the receptacle being formed by a membrane with an integral border thereof defining the said at least one aperture, said border being resilient, non-reinforced and adapted on moderate dilation of admitting a portion of the limb into the receptacle and to form a physiologically acceptable seal thereon.

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3. A protector as claimed in claim 2 wherein said resilient integral border defining said at least one apertures in use, is between 3 and 30 mm in width, does not exhibit longitudinal wrinkles capable of channelling contaminants through the seal, and is capable of pressing on the skin with a pressure great enough to effectively halt the passage of contaminants between the skin and the border adjacent to the skin, but substantially not great enough to stop the flow of fluids inside the limb.

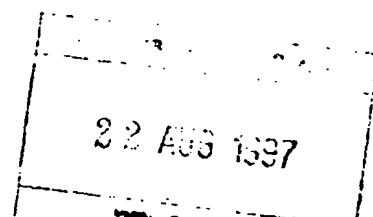
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4. A protector as claimed in claims 2 or 3 wherein the entire protector is made of a resilient material.

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5. A protector as claimed in claim 4, wherein the resilient material is rubber latex.
6. A protector as claimed in claim 5, wherein the thickness of the material is
5 between 0.2 and 1 mm, so that the material has useful durability, yet is not heavy enough to drag on the limb.
7. A protector as claimed in claim 6, wherein the thickness of the material is about 0.5
10 mm.
8. A protector as claimed in claims 2 or 3, wherein those portions of the protector remote from the at least one aperture are made from a substantially non-resilient material.
9. A range of protectors, any one of which is as claimed in any previous claim,
15 wherein the range includes more than one size of protector in order to be compatible with various sizes of adult and child limbs.
10. A range of protectors, any one of which is as claimed in claims 2 to 9, wherein the
20 range includes more than one size in order to be compatible with various sizes of animal limbs.
11. A protector as claimed in any one of claims 2 to 10, wherein a series of concentric
25 indicia are placed on the resilient integral border about the at least one aperture; the indicia being capable of acting as cutting guides for enlargement of the at least one aperture.
12. A method for making a protector as claimed in any one of claims 2 to 11,
30 comprising the steps of dipping a shaped form into an emulsion of latex, then removing it for drying and then stripping the dried latex off the mould, and then cutting at least one aperture in the shaped form of a size capable of forming a sealable opening with a mammalian limb.



13. A method for applying a protector as claimed in any one of claims 2 to 12,
comprising the steps of opening the at least one aperture with the jaws of a dilator,
and passing the opened aperture about the jaws over the dressed limb until the
opened aperture is at a site where the seal is to be applied, and then removing the
dilator whereupon the seal is formed against the site.

14. A protector as claimed in claim 1 or 2 substantially as herein described with
reference to the accompanying drawings.

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Howland

END OF CLAIMS

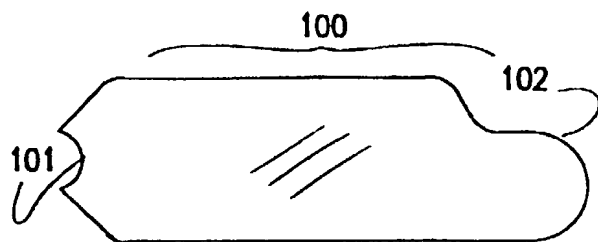


Fig 1

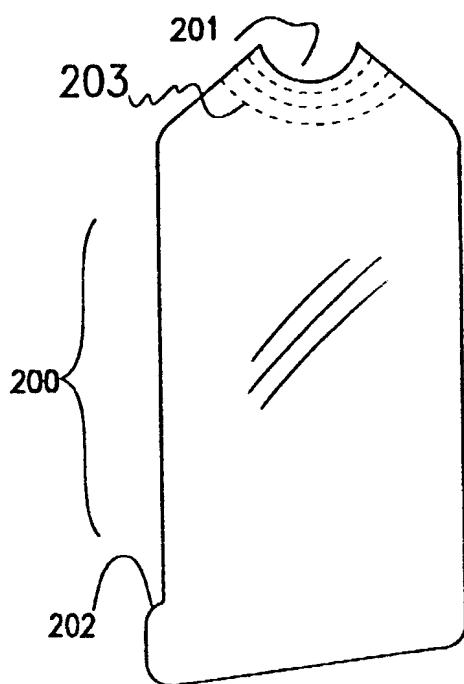


Fig 2

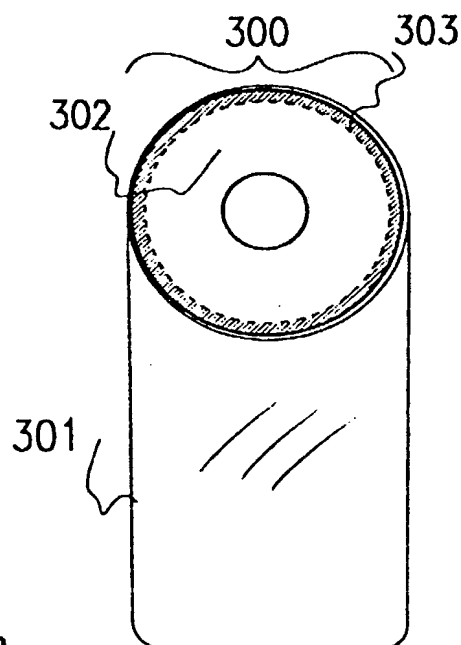


Fig 3

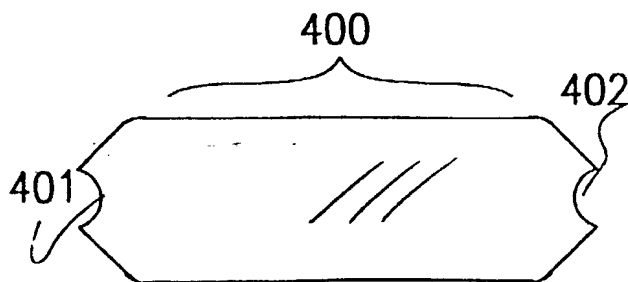


Fig 4

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**NEW ZEALAND
PATENTS ACT 1953
COMPLETE SPECIFICATION**

Title of Invention:

A protector

**Name, address and nationality of
applicant(s) as in international
application form:**

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Auckland, New Zealand**

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